1. Consider a car-inspection center where cars arrive at a rate of one every 50 seconds and wait for an average of 15 minutes (inclusive of inspection time) to receive their inspections. After an inspection, 20% of the car owners stay back an average of 10 minutes having their meals at the center’s cafeteria. What is the average number of cars within the premises of the inspection center (inclusive of the cafeteria)?

2. A mail order company has 3 persons serving incoming calls. The calls arrive according to a Poisson process with intensity of 1/min and the average call duration is 2 min.
   a) What is the probability that an incoming call is blocked, when blocked calls are lost?
   b) Is it profitable to hire a 4th person if the total expenses per person are 100 mk/h and the average revenue per order is 20 mk?

3. Customers arrive at a two-server system according to a Poisson process having rate $\lambda = 5$/min. An arrival finding server 1 free will begin service with that server. An arrival finding server 1 busy and server 2 free will enter service with server 2. An arrival finding both servers busy goes away. Once a customer is served by either server, he departs the system. The service times of the servers are exponential with rates $\mu_1 = 4$/min and $\mu_2 = 2$/min. a) What is the average time an entering customer spends in the system? b) What proportion of time is server 2 busy?